

Purdue University
Purdue e-Pubs

ECT Fact Sheets

Emerging Construction Technologies

1-1-2012

Super FLEX wall - New frame system for high rise buildings

Purdue ECT Team
Purdue University, ectinfo@ecn.purdue.edu

DOI: 10.5703/1288284315715

Follow this and additional works at: <https://docs.lib.purdue.edu/ectfs>



Part of the [Civil Engineering Commons](#), and the [Construction Engineering and Management Commons](#)

Recommended Citation

ECT Team, Purdue, "Super FLEX wall - New frame system for high rise buildings" (2012). *ECT Fact Sheets*. Paper 6.
<http://dx.doi.org/10.5703/1288284315715>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries.
Please contact epubs@purdue.edu for additional information.



SUPER FLEX WALL - NEW FRAME SYSTEM FOR HIGH RISE BUILDINGS

THE NEED

Seismic resistivity of high rise building is of prime importance. But the structural frame work that is required to ensure this often poses problems in architectural effects and in realizing wide views from the building. The Super Flex wall frame system ensures excellent earthquake resistance with fewer limitations by the columns and beams.

THE TECHNOLOGY

The "Super Flex Wall" is a structural frame method newly developed by the Takenaka Corporation, used in combination with a core wall (the earthquake-resistant reinforced concrete wall penetrating through the center of the building from the lower part to the top floor) and a structural control method or with a base-isolation method. Part of the structure is cantilevered from the central core along the periphery of the building. Outrigger beams control any bending deformation throughout the building, these are beams with larger cross-sections than normal beams, and are installed in intermediate floors and in the top floor. Structures called 'Megawalls' are built to control any bending deformation throughout the building, these are wall beams the height of one floor layer, and are installed in intermediate floors and in the top floors.

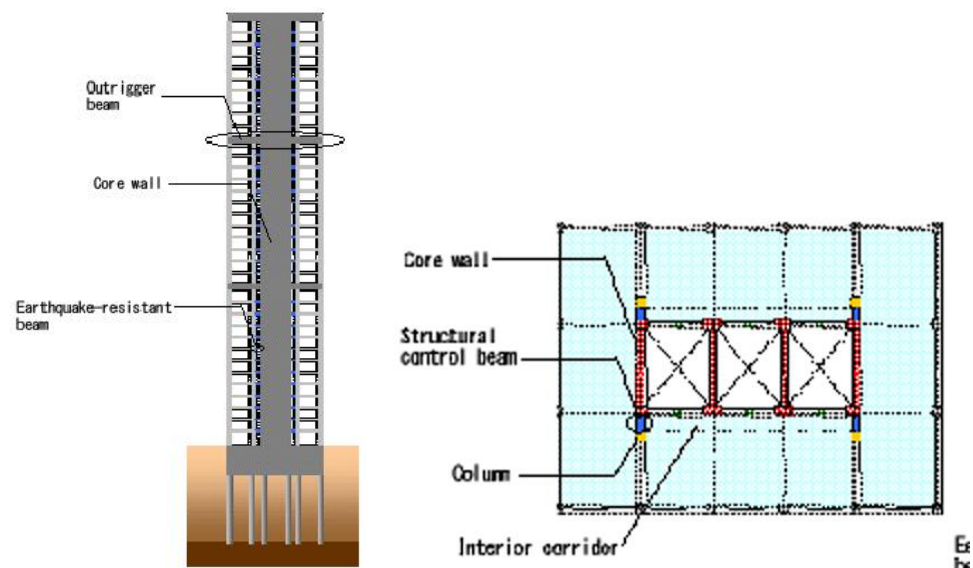


FIGURE 1 SUPER FLEX WALL



THE BENEFITS

- In combination with a structural control or base isolation method, this method can ensure a high level of safety. By using the Super Flex Wall in combination with either a core wall and structural control frame, or a base-isolation frame, the shaking and damage caused during a major earthquake can be reduced, realizing a superhigh-rise apartment building with excellent earthquake resistance.
- Realizing a wide view. By supporting the building with the core wall installed in the center of the building, the columns and beams around the outer side can be made smaller, and even be done away with in parts. This means a large surface area can be used for the openings, maintaining maximum views.
- The method can be used for various housing plans, with less limitations by the columns and beams. By placing the core wall in the center of the building, various types of plans can be used for the housing parts around the building.

STATUS

The Takenaka Corporation has successfully used the Super Flex Wall in the "Akasaka Tower Residence Top of the Hill" (in Minato-ku, Tokyo), the "City Tower Nishi-Umeda" (in Fukushima-ku, Osaka), and the "AMEX Ohori Tower" (in Chuo-ku, Fukuoka City) superhigh-rise apartment buildings are under construction using the new method.

As a structural frame method enabling various types of housing plans in superhigh-rise apartment buildings, the "Super Flex Wall" is the second release in the structural frame series following the "Super Flex Tube" (registered trademark) which was released in 2004. The company will be proactively making proposals using the new method in future projects.

- At the "Akasaka Tower Residence Top of the Hill" project (in Minato-ku, Tokyo), the "Super Flex Wall" is being used, with the core wall and the adjacent structural control beams. In order to reduce the bending deformation of the core wall, outrigger beams(*1) of 1.6 to 1.8 meters in length are installed in two intermediate floors, and the top floor. Columns are installed across the interior corridors from the core wall, with structural control beams installed in the short span between the core wall and the columns. These structural control beams are made of steel with outstanding deformation performance, and efficiently absorb earthquake input energy.



- At the "City Tower Nishi-Umeda" (in Fukushima-ku, Osaka), and at the "AMEX Ohori Tower" (in Chuo-ku, Fukuoka City), the "Super Flex Wall" is being used, with a frame with a core wall installed in the center of the building in combination with a base-isolation structure. In order to reduce the bending deformation of the core wall where required, mega-walls(*2) the height of one floor layer are installed. The core wall installed in the center of the building maintains the rigidity (deformation difficulty) of the building, and the base-isolation structure effectively absorbs almost all earthquake input energy.

BARRIERS

The ATLSS connections have been used successfully but the use has been limited. Future use and technology transfer to the industry will be required.

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.

PUBLISHER

Emerging Construction Technologies, Division of Construction Engineering and Management, Purdue University, West Lafayette, Indiana